Andrew Schechtman-Rook, Ph.D.
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SUMMARY

- 8+ years of experience with analysis of large, complex datasets.
- Strong programming, numerical analysis, and visualization skills.
- Extensive familiarity with linear and non-linear model fitting.
- Experience writing software for both parallel and distributed environments.
- Able to work independently as well as part of a team.
- Practiced writer and speaker for technical and non-technical audiences.

SKILLS

Technical

Programming: C++, C#, Python (including Matplotlib, MySQL-python, Numpy, pyMC, Scikit-learn, Scipy), R, Unix shell scripting.
Databases and Web Design: Django, HTML, MySQL, PHP.
Operating Systems: Linux, Mac OS X.
Data Analysis: Bootstrapping; genetic algorithms; image processing and machine vision; interpolation; linear and non-linear regression; Markov Chain Monte Carlo; numerical integration and differentiation; parallel and distributed computing; principal component analysis; rootfinding.

Communication

Oral Presentations: Gave talks describing advanced analysis and modeling to both expert and non-expert audiences.
Writing: Published research in leading peer-reviewed scientific journals (see below for selected publication list).

WORK EXPERIENCE

Research Associate 2014-Present
University of Wisconsin-Madison

- Devised new metrics to determine the cause of mis-match between numerical models and astronomical data.
- Implemented a Voronoi Tesselation algorithm maximize spatial resolution and signal in images.
- Constructed advanced visualization tools to aid in the refinement of data processing techniques.
- Trained and mentored undergraduate and graduate students in programming and statistical analysis.

Research Assistant 2007-2013
University of Wisconsin-Madison

- Developed non-linear Levenberg-Marquardt χ^2 fitting algorithms to constrain models of spiral galaxies to data.
- Employed on-campus distributed computing resources to perform large-scale modeling, using over 20 years of computer time in 1 month.
- Created a genetic algorithm to efficiently fit galaxy models with unusually large numbers of free parameters to high-resolution images.
- Utilized frequency-domain analysis to understand the spatial distribution of galactic structure.
- Computed descriptive statistics about 200+ astronomical objects from raw survey data automatically via custom-built analysis software.
- Implemented methods comparing different fitting statistics to compute global best-fitting parameters for multiple datasets.
- Discovered and classified a previously unknown galaxy by simultaneously using data from seven different sources.

Teaching Assistant 2008-2009
University of Wisconsin-Madison

- Taught six discussion sections of an introductory undergraduate astronomy course.
- Prepared engaging lesson plans, including interactive demonstrations and group problem-solving activities.

Research Assistant 2006-2007
Case Western Reserve University

- Designed and executed statistical analyses of simulated galaxy clusters to optimize strategy for future data acquisition.
- Used nearest-neighbor and regression analysis to compute a transform between astronomical filter systems.

Physics Lab Assistant 2005-2006
Case Western Reserve University

- Maintained existing equipment and computers for introductory physics labs.
- Developed and built components for new labs.
- Upgraded hardware and software for over 20 lab computers.

OTHER RELEVANT EXPERIENCE

Independent NFL Analyst 2013-Present
phdfootball.blogspot.com

- Performed novel statistical analyses on publicly available NFL data.
- Mined a database containing over 500,000 entries across dozens of tables for complex relationships in play-by-play data.
- Developed custom software and visualization tools to efficiently examine hundreds of thousands of individual plays.
- Explained findings in a manner accessible to all audiences through both written posts and evocative figures.

EDUCATION

Ph.D., Astronomy, University of Wisconsin-Madison December 2013

- Wisconsin Space Grant Consortium Graduate Fellowship
- International Astronomical Union Travel Grant
- American Astronomical Society Chambliss Student Award
- University of Wisconsin-Madison Astronomy Department Whitford Award

MS, Astronomy, University of Wisconsin-Madison June 2009
BS, Astronomy, Case Western Reserve University May 2007

- Graduated *cum laude*
- Minors in Physics and Classics

SELECTED PUBLICATIONS

Schechtman-Rook, A. & Bershady, M. A., "Near-Infrared Structure of Fast and Slow Rotating Disk Galaxies", 2014, *in prep*

Schechtman-Rook, A., Ph.D. Dissertation: "Lifting the Dusty Veil: Understanding the Stellar Structure of Spiral Disks"

Schechtman-Rook, A. & Bershady, M. A., "Near-infrared Detection of a Superthin Disk in NGC 891", 2013, *ApJ*, 773, 45

Schechtman-Rook, A. & Hess, K. M., "NGC 4656UV: A UV-selected Tidal Dwarf Galaxy Candidate", 2012, *ApJ*, 750, 171

Schechtman-Rook, A., Bershady, M. A., & Wood, K., "The Three-dimensional Distribution of Dust in NGC 891", 2012, *ApJ*, 746,70